

OCT 05 2006

REMARKS

Favorable reconsideration of this application is respectfully requested in view of the above amendments and following remarks. Claims 1, 3, 6, 7, and 19 are amended and are supported, for example, in original claims 2, 6, 7 and the description of Figures 4 and 5 at page 14, line 13 to page 15, line 14. Claims 2, 10-18, and 21-22 are canceled without prejudice or disclaimer. No new matter has been added. Claims 1, 3-9, 19, and 20 are pending.

Claims 1, 6, 7, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sekiguchi et al. (US 2004/0201787) in view of Smith (US 5797050). This rejection is moot in view of the inclusion of the feature of claim 2 in the independent claims. Applicant does not concede the correctness of this rejection.

Claims 2-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sekiguchi et al. (above) in view of Smith (above) as applied to claim 1, and further in view of Shiraishi et al. (US 4589732). Applicant respectfully traverses this rejection.

Claim 1 recites a liquid crystal shutter including the limitations of claim 2 and having, among other features, a light shielding film formed on a surface of a second transparent substrate, which faces a first transparent substrate. A transparent electrode is laminated over the light shielding film via a single insulating layer. The insulating layer is made of an inorganic oxide. (Original claim 2.) The light shielding film comprises a metal layer and a surface layer made of a metal oxide, the surface layer of the light shielding film is held in contact with the insulating layer. Claim 19 is a printhead having a liquid crystal shutter of claim 1. In Fig. 4, for example, the insulating layer 53b made of an inorganic oxide is shown to be held in contact with the light shielding film 52. In Fig. 5, the light shielding film 52 is shown to include a chromium core layer 522 (metal layer) sandwiched between two surface layers 521 and 523 made of chromium oxide (metal oxide), so that the upper surface layer 523 comes into contact with the insulating layer 53b when the latter layer is formed over the light shielding film 52.

The references cited do not teach or suggest the required combination of features of claims 1 and 19. Sekiguchi et al shows an LC shutter device wherein a black matrix layer 25 (or 26 or 27) made of a chromium film is held in contact with an insulating film 30 made of photosensitive acrylic resin. (See Paragraphs [0088] and [0092].) However, the chromium film 25 of Sekiguchi does not satisfy the light shielding film of claims 1

and 19, and namely the requirements of a metal layer and a surface layer made of a metal oxide. Furthermore, Sekiguchi does not teach or suggest the insulating layer of claims 1 and 19, since the resin film 30 of the reference is a photosensitive acrylic resin, and not an inorganic oxide layer.

Smith does not provide what is missing from Sekiguchi. Smith discloses a light blocking layer 200 and a dielectric mirror 190. However, the reference fails to teach or suggest specific materials for a light blocking layer 200 and a dielectric mirror 190, let alone the required materials in the insulating layer and light shielding film structure of claims 1 and 19.

Furthermore, there is no reasonable suggestion to modify Sekiguchi with Smith to arrive at the features of claims 1 and 19. For example, there is nothing in the references that would motivate one of skill in the art to include a metal oxide on a surface layer of the black matrix layer 25 of Sekiguchi. Likewise, there is no reasonable suggestion to modify Sekiguchi's insulating layer film 30, which is made of photosensitive acrylic resin, to include the inorganic oxide layer required by claims 1 and 19.

Regarding Shiraishi, this reference is no more relevant and does not remedy the deficiencies of Sekiguchi and Smith in arriving at claim 1. Shiraishi merely discloses a metal layer 80 in contact with a SiO₂ layer 82 which in turn is held in contact with an orienting layer 84 made of polyimide. (Col. 6, lines 27-34.) However, Shiraishi does not further the alleged teachings of Sekiguchi and Smith.

Moreover, Applicant has found that the features of claim 1 can provide an improved shutter device. For example, the light shielding film 52 provides a good light shielding effect due to the incorporation of the metal layer 522, while also provide good adhesion to the insulating layer which is made of an inorganic oxide similarly to the surface layer 523 of the light shielding film 52. (See for example Page 16, lines 16-21.) Therefore, the light shielding film 52 as a whole can be made very thin but yet provides a sufficient light shielding ability while preventing the insulating layer 53b from coming off the light shielding film 52. The cited references, either alone or in combination, fail to suggest that such advantageous effects could be obtained. For at least the foregoing, Applicants respectfully submit that claims 1 and 19 and their dependent claims are patentable. Likewise, Applicants respectfully submit that claims 3-5 are also patentable for at least the same reasons discussed with respect to claim 1.

Favorable reconsideration and withdrawal of the rejection is respectfully requested.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sekiguchi et al. (above) in view of Smith (above) as applied to claim 1, and further in view of Takimoto et al. (US 5384649). Applicant respectfully traverses this rejection.

Sekiguchi and Smith have been distinguished above. Takimoto does not remedy the deficiencies of Sekiguchi and Smith in arriving at claim 1. Takimoto discloses light blocking films 21, 28, each of which is a mono-layer structure, which does not satisfy the requirements of claim 1. Therefore, the reference does not provide what is missing from Sekiguchi and Smith to lead to claim 1. Thus, as claim 8 depends upon and further limits claim 1, Applicant respectfully submits that this claim is patentable for at least the reasons with respect to claim 1 already discussed. Applicant does not concede the correctness of this rejection.

Favorable reconsideration and withdrawal of the rejection is respectfully requested.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sekiguchi et al. (above) in view of Smith (above) and further in view of Takimoto et al. (above) as applied to claim 8, and further in view of Fukushima et al. (US 5130830). Applicant respectfully traverses this rejection.

Fukushima does not further the teachings of Sekiguchi, Smith, and Takimoto. Claim 9 depends upon and further limits claims 1 and 8. As with Takimoto, Fukushima merely shows a mono-layer structure, and is also deficient. Thus, Applicant respectfully submits that claim 9 is patentable for at least the reasons with respect to claim 1 already discussed. Applicant does not concede the correctness of this rejection.

Favorable reconsideration and withdrawal of the rejection is respectfully requested.

Claims 10-16, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sekiguchi et al. (above) in view of Smith (above) and Shiraishi et al. (above). This rejection is moot in view, as claims 10-16, 21, and 22 have been canceled. Applicant does not concede the correctness of this rejection.

OCT 05 2006

In view of the above amendments and remarks, Applicant believes that the pending claims are in a condition for allowance. A Notice of Allowance is respectfully solicited. If any questions arise regarding this communication, the Examiner is invited to contact Applicant's representative listed below.

Respectfully submitted,



HAMRE, SCHUMANN, MUELLER &
LARSON, P.C.
P.O. Box 2902
Minneapolis, MN 55402-0902
(612) 455-3800

Dated: October 5, 2006

By: _____

Douglas P. Mueller
Reg. No. 30,300
DPM/baw